KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

436 Seventh Avenue, Suite 1940, Pittsburgh, PA 15219

April 8, 1987

Mr. Larry Wright
Chief, Superfund Enforcement Section
U.S. Environmental Protection Agency
Region VI
1445 Ross Avenue
Dallas, Texas 75202

Re: South Cavalcade RI/FS
1573-73

Dear Mr. Wright:

Enclosed you will find the drilling specifications for the construction of the second deep groundwater monitoring well (Attachments A, B, and C) which we propose to follow in the installation of the well. These specifications are submitted for your review and comment. Will you please advise us of your approval or suggested changes as soon as possible? The tentative start date is April 20, 1987.

Sincerely yours,

Shannon K. Craig

Shannon K. Craig,
Project Manager for
James R. Campbell, Ph.D.
Program Manager, Previously Operated Properties

Enclosures
cc: D.Sorrels, TWC
J.Campbell

ATTACHMENT A

GENERAL SPECIFICATIONS

CONSTRUCTION OF DEEP GROUNDWATER MONITORING WELL
SUBTASK 2E
KOPPERS SOUTH CAVALCADE SITE
HOUSTON, TEXAS

A. General

1. Site is located near 2000 Cavalcade Street in Houston, Texas.

2. Site visits can be arranged by contacting Bill Tobin with McBride-Ratcliff and Associates at (713) 460-3766.

3. Estimated start date is April 1987.

4. Desired working hours are 7:00 a.m. to 5:00 p.m., Monday through Friday.

5. General Contractor is Koppers Company, Inc., Pittsburgh, Pennsylvania. Technical contact is Jim Campbell: PGH (412) 227-2689 or Shannon Craig - (412)-733-9499. Contract administrator is George McGinley: PGH (412) 227-2698.

6. Koppers Representatives are McBride-Ratcliff and Associates. Mr. Bill Tobin (713) 460-3766 and Keystone Environmental Resources Ms. Shannon Craig (412)-733-9499. Al Quagliotti, Mgr. (412) 733-9451, and Mike Helbling, Project Hydrogeologist.

7. This site contains documented EPA priority pollutant compounds. Analytical test data will be made available upon written request.

B. Utilities

1. Water (garden hose and fire hydrant) and electricity will be provided at Koppers expense at a central on-site location.

2. The Drilling Contractor will be responsible for transporting water and providing electrical generators when required.

C. Waste Handling

1. Koppers will provide all waste storage containers.

2. The Drilling Contractor will be responsible for collection and placement of waste materials into on-site containers.

3. Koppers will be responsible for transport, storage and disposal of all waste materials.

4. Drilling Contractor will provide all equipment including pumps, lines, and pits necessary for collection and placement of waste into storage containers.

D. Steam Cleaning

1. Koppers will provide a steam cleaner and decontamination facilities at a central on-site location.

2. The Drilling Contractor will be responsible for conducting steam cleaning and decontamination services.

E. Security

1. The Drilling Contractor may temporarily store equipment and materials on-site at his own risk.

2. Koppers assumes no responsibility for theft, damage, or security of Contractors equipment and materials.

F. Safety

1. Drilling Contractor will be required to wear: rubber gloves, steel toe and shank rubber boots, safety glasses or goggles, hard hat, and coveralls during all on-site activities.

2. Koppers will provide personnel decontamination facilities for clothes changing, boot washing, and hand cleaning. Personnel shower facilities will not be provided.

3. Koppers will provide coveralls and rubber gloves.

4. No smoking or eating will be permitted during on-site activities.

5. The use of air-purifying respirators and chemically resistant disposable coveralls may be required and will be provided by Koppers.

6. Working hours may be curtailed or modified if heat stress becomes a problem.

7. Koppers reserves the right to require medical examinations of Contractor personnel or request certification of previous medical examinations for less than 1 year for all on-site personnel, including subcontractor. The cost of medical examinations will be the responsibility of Koppers.

G. Borehole Logging

1. Koppers will provide full-time on-site geologist to log and classify soil samples.

2. Sample extrusion and sample decontamination will be the responsibility of the Drilling Contractor.

H. Miscellaneous

1. Drilling Contractor downtime associated, but not limited to: inclement weather, mechanical failures, material shortages, grout set up time and incomplete equipment decontamination and waste collection will not be cause for reimbursement.

2. All Drilling Contractor operations will be subject to full-time inspection of EPA and their designated representative.

ATTACHMENT B.

TECHNICAL SPECIFICATIONS

CONSTRUCTION OF DEEP GROUNDWATER MONITORING WELL
SUBTASK 2E
KOPPERS SOUTH CAVALCADE SITE
HOUSTON, TEXAS

Introduction

The South Cavalcade site remedial investigation is being conducted by the Koppers Company by Administrative Order from the Region VI EPA under the CERCLA (Superfund) Program. The purpose of the deep groundwater monitoring well installation is to evaluate potential contaminants in a documented water supply sand unit located about 180 ft. below ground surface. Because of the importance of the sand unit and potential consequences of deep groundwater contamination, a high degree of quality control awareness will be maintained throughout the well installation program. It is our intention to reduce the possibility of cross contamination by enforcing strict equipment and materials cleaning, decontamination, and handling procedures.

Scope

The work provided for herein consists of furnishing all labor, materials, and equipment, and performing all operations necessary to drill, construct, and develop one deep groundwater monitoring well.

Quality Control

The Drilling Contractor shall establish and maintain quality control for all monitoring well construction and development activities to assure compliance with the contract specifications and requirements; and maintain records of quality control for all operations including but not limited to the following:

a) Drilling and sampling borehole.
b) Installation and sealing of surface casing.
c) Installation of well screen and riser.
d) Placement of filter pack and grout seals.

e) Development of monitoring well.
f) Decontamination and steam cleaning of drill rig, tools, mud pit, and downhole equipment.
g) Handling of drilling muds, well development water, and soil cuttings.
h) Inventory of materials used and time log of all construction activities.

A copy of these records shall be furnished to Koppers Representative for review at the completion of the job.

General

The location of the deep monitoring well will be specified by Koppers. Access will be provided to the well location and no overhead restrictions are anticipated.

The anticipated installation depth of the monitoring wells is about 180 feet, in an approximate 210 ft. borehole. The actual depth may vary and will be determined in the field by the Koppers Representative.

The well will be constructed using telescoping well installation techniques. A surface casing of approximately 14 inch diameter PVC or steel, with flush threaded joints will be installed and grouted into place using a Portland cement and Bentonite mixture. This surface casing will extend to an approximate depth of 70 feet. An intermediate casing of 10 inch diameter PVC or steel with flush threaded joints will be set at an approximate depth of 140 feet with Portland cement and Bentonite grout. Teflon tap will be used with the flush, threaded joints to insure a good seal. No other sealants will be permitted. The monitoring well will consist of 4 inch diameter stainless steel screen and riser pipe with flush threaded joints. Approximately 30 feet of screen and 180 feet of riser will be required.

Representative soil samples shall be obtained generally on 5 foot centers to the final depth of the borehole. Additional samples may be requested by Koppers Representative at selected borehole depths.

After completion of the monitoring well installation, and approval by Koppers

Representative, the well will be developed by using pumping techniques.

Setup

The location of the deep monitoring well will be field staked by the Koppers Representative. Prior to drilling and installation, The Drilling Contractor will steam clean all equipment including, drill rods, bits, and mud pits, drill stem, and drill rig. No petroleum lubricants will be permitted. Labortory grade detergents may be used as lubricant substitutes. A minimum 6 mil. plastic underliner shall be placed under the mud pit and extent a sufficient distance throughout the work area to prevent surficial contact with drilling muds and soil cuttings.

Surface Casing Installation

A minimum 18 inch-diameter borehole shall be initially advanced through the upper water-bearing strata to a depth of about 70 feet, as determined by Koppers Representative, using mud rotary drilling procedures to determine the actual depth of the surface casing installation based on the depth of observable soil contamination and the depth to suitable clay soils. The soil boring procedures are outlined in the following section. Drilling mud shall be used throughout the initial depth 70 feet of the borehole. The drilling mud shall consist of pure sodium bentonite, with no polymers or additives, and shall meet API Specification 13A. A sample of the proposed drilling mud shall be submitted to Koppers Representative for approval, prior to use. Weight materials, such as Barite, will not be permitted.

Upon completion of the final borehole all drilling mud and soil cuttings will be completely removed and flushed from the borehole with a grout mixture which will be tremied from the bottom. All drillings muds and soil cuttings will be collected and temporarily store onsite, as directed by Koppers Representative. Also, the drilling rig, mud pit, and all downhole equipment shall be thoroughly steam cleaned.

Once the 18 inch borehole is filled with the Portland Cement III and bentonite mixture a 14 inch-diameter, Schedule 80 PVC or steel, flush jointed surface casing shall be installed to the full depth of the 18 inch borehole. The surface

casing shall be fitted with stainless centralizers no greater than 20 ft. on center (at 10 ft., 30 ft.,50 ft., 70 ft.). Metal screws or glue will not be permitted to attach the centralizers. The 14 inch surface casing shall be thoroughly steam cleaned prior to installation. The bottom of the surface casing shall be fitted with a threaded cap or a welded PVC plate to prevent the inflow of formation soils and groundwater. The use of potable water or clean drilling mud mixture to achieve negative buoyancy will be permitted during casing installation.

Therefore the annulus between the 18 inch borehole and the 14 inch-PVC or steel surface casing shall be a grout mixture tremied from the bottom of the borehole to the top until a visually consistent grout return is observed. The grout mix shall consist of a maximum cement to bentonite ratio of 10:1. All displaced groundwater and drilling fluids will be collected and temporarily stored onsite, as directed by Koppers Representative. The grouted surface casing shall not be disturbed for a minimum 48 hour period to allow the grout to set.

After installation of the surface casing, all downhole equipment, drilling rig, drill steam, and mud pit shall be thoroughly steam cleaned.

Soil Boring

All drilling will be conducted with mud rotary techniques. The first 70 feet of borehole will be advanced by utilizing an 18 inch wing bit. The second section, to approximately 140 feet, will be advanced using a 13.5 inch bit. The final section of borehole will be advanced with a 9 inch bit to a depth of approximately 210 feet. A schematic of the well construction is shown in figure 1.

Drilling Procedures

The Drilling Contractor shall submit a bid quotations to complete the well borehole. Koppers Company with approval from the EPA will be responsible for selection of the actual drilling procedure to be used on this project.

Wet Rotary With Recirculation

This procedure includes advancing the borehole using standard wet rotary drilling procedures. Potable water shall be used as the drilling fluid to advance the borehole. The use of drilling mud, if required, shall be approved by the Koppers Representative prior to use.

Sampling

Representative soil samples shall be obtained at 5 foot intervals for the entire depth of borehole, using a 2.5 inch-diameter split spoon or 3 inch-diameter Shelby tube sampler, depending on soil conditions. The samplers shall be throughly decontaminated after each use. The Koppers Representative may delete or add specific samples depending on the formation characteristics. A minimum 12 inch recovery of in-situ soils for all soil samples will be required before additional drilling is approved.

Monitoring Well Materials

The monitoring well screens shall extend throughout the entire internal depth of the sand unit (estimated 30 ft. long) and will consist of 4 inch-diameter, flush jointed, Schedule 40 Type 304 stainless steel. The screens shall be commercially manufactured with uniform 0.010 inch slots. The bottom of the screen section shall be fitted with a threaded flush joint bottom cap. The use of a backwash valve is subject to prior approval by Koppers Representative. The well riser pipe to ground surface shall be 4 inch-diameter, Schedule 40 Type 304 stainless steel, flush jointed pipe. Well materials for drilling should all be 4-in.-diameter, flush jointed, Schedule 40 Type 304, stainless steel. The riser pipe shall be fitted with stainless steel centralizers no greater than 20 ft. on center. The screen section shall be fitted with at least three centralizers placed uniformly at the bottom, middle, and top of the screen. Metal screws or glue will not be permitted to attach the centralizers. All well materials, including centralizers, shall be thoroughly decontaminated and steam cleaned and approved by Koppers Representative prior to installation.

Monitoring Well Installation

The monitoring well shall extend to a depth of about 210 ft, as determined by Koppers Representative. The borehole shall be flushed with potable water to remove drilling muds and soil cuttings, as directed by Koppers Representative. In addition, all downhole equipment, drilling rig, drill stem, mud pit, and well screen and riser pipe shall be thoroughly steam cleaned. The well screen and riser pipe shall be placed in the borehole in such a manner to ensure that the assembly is not damaged or misaligned. Care shall be used during installation to ensure the well screen and rise pipe is centered in the drilled hole. The use of backwashing procedures to facilitate well placement is subject to prior approval by Koppers Representative.

Filter Pack and Grout

Filter sand shall be placed by tremie around the screened internal and at least 5 feet above the top of the screen. The tip on the tremie pipe may be used to determine the level of the filter pack. A 5 foot bentonite seal shall be placed immediately above the filter pack using premium grade bentonite grout. The remainder of the annulus shall be pressure grouted by tremie, from the bottom to to top, until a consistent grout return is observed. The volclay grout mix shall be used. The grout shall set a minimum of 48 hours prior to well development.

The filter pack shall conform to the following gradation requirements.

WELL FILTER MATERIAL

Standard Sieve Size	Percent Passing
16	98 - 100
20	90 - 100
30	75 - 98
40	27 - 80
50	10 - 25
60	5 - 15
100	0 - 2

The filter material shall be graded uniformly between the limits specified above. The Drilling Contractor shall demonstrate to Koppers Representative that the filter selected for the wells corresponds to the specified gradation requirements.

Well Development

The development process shall consist of surging the wells by pumping. The development method shall be capable of evacuating the well of any residual drilling fluid or sediment which has migrated into the well.

The well shall be developed until a sediment-free as possible discharge is achieved or the conductivity and pH are stable.

After development, and approval by Koppers Representative, the well will be pumped until at least 4,800 gallons of groundwater is removed. All well water is to be collected and temporarily stored onsite, as directed by the Koppers Representative.

Surface Detail

The 14 and 10 inch-diameter PVC surface casing shall be cut flush with the ground surface and capped with cement. The stainless steel well raiser shall be cut off to provide a 2.5 foot stickup. The well shall be vented and fitted with a male adapter and a threaded stainless steel cap. A steel locking protective casing will be installed and cemented into place around the 4-inch well.

Decontamination and Cleaning Procedures

All tools, downhole equipment, and pit, drill rods, bits, and drill rig will be completely steam cleaned at the following instances:

a) initial equipment setup
b) after completion of any mud changes
c) after installation of surface casing
d) before installation of well screen
e) final demobilization

Additional equipment steam cleaning may be required by Koppers Representative. All supplemental downhole equipment and materials such as, but not limited to: well pipe, measuring tapes, tremie pipes, submersible pumps, surface casing, etc., will require decontamination and steam cleaning prior to use.

Decontamination will consist of a detergent wash. A methanol rinse may also be required by Koppers Representative. Steam cleaning will immediately follow all decontamination activities. The extent of decontamination and steam cleaning will be determined by Koppers Representative. No equipment or downhole materials will be permitted to enter the borehole unless decontamination and cleaning have been approved by Koppers Representative.

Soil samplers will be decontaminated between each sampling interval prior to use. Decontamination will consist of the following procedures:

a. detergent scrub
b. clean water rinse
c. methanol rinse
d. air dry

Care should be exercised during storage and handling of decontaminated samplers between use. The extent of decontamination will be determined by Koppers Representative. No samplers will be permitted to enter the borehole unless decontamination has been approved by Koppers Representative.

Waste Handling and Disposal

All waste material shall be collected and placed into secure storage containers. No onsite disposal of waste materials will be permitted. Waste materials will include, but not limited to:

a. drilling muds
b. soil cuttings
c. discarded soil samples
d. equipment decontamination waters
e. sampler decontamination waters

f. all solids and fluids removed from borehole

g. well development water

h. disposable safety items

Surface spillage of waste materials due to improper collection and handling will be the responsibility of the Contractor. All waste material collection and handling activities will be at the direction of Koppers Representative.

ATTACHMENT C.

BID QUOTATION

CONSTRUCTION OF DEEP GROUNDWATER MONITORING WELL
SUBTASK 2E
KOPPERS SOUTH CAVALCADE SITE
HOUSTON, TEXAS

_____ (Bidders Name) hereby proposes to furnish to all labor, materials, equipment, and related services to perform the work in strict accordance with the contract plans and specifications as described herein, for the fixed unit prices and lump sum fees indicated as follows:

	Task	Cost
A.	Provide mobilization and demobilization of all drilling equipment, supplies, personnel and materials and steam cleaning of all equipment for the lump sum of.....	$_____ each
B.	Conduct equipment setup and take down including steam cleaning of all equipment for the lump sum of	$_____ per well
C.	Furnish all equipment, labor, and materials and performing all operations necessary to drill and sample at 5-foot intervals to the following depths for the fixed unit prices of .....$	_____

Boring Depth	
0 to 50 ft...	$ _____ per foot
50 to 100 ft...	$ _____ per foot
100 to 150 ft.	$_____ per foot
150 to 200 ft.	$ _____ per foot
200 to 250 ft.	$_____ per foot

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C.1 In the event that additional samples are required, additional samples will be obtained for the fixed unit price of ..... $ _____ per sample (ADD)

C.2 In the event that less sampling is required, omitted samples will be deducted for the fixed unit price of.. $_____ per sample (DEDUCT)

D. Furnish all equipment, labor, and materials and performing all operations necessary to drill, construct and install a 14-inch diameter PVC surface casing to a depth of 70 feet using wet rotary procedures, including two steam cleanings of equipment and materials, grouting inplace, and one mud change for the lump sum of ..... $_____each

D.1 In the event the surface casing installation is greater than 70 feet, additional casing will be installed for the fixed unit price of ..... $_____per foot (ADD)

D.2 In the event the surface casing installation is less than 70 feet, omitted surface casing will be deducted for the fixed unit price of ..... $_____per foot (DEDUCT)

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E. Furnish all equipment, labor, and materials and performing all operations necessary to drill, construct and install a 10-inch diameter PVC surface casing to a depth of 145 feet using wet rotary procedures, including two steam cleanings of equipment and materials, grouting in place, and one mud change for the lump sum of ..... $_____
(EACH)

E.1 In the event the surface casing installation is greater than 145 feet, additional casing will be installed for the fixed price of ... $_____ per foot
(ADD)

E.2 In the event the surface casing installation is less than 145 feet, omitted casing will be deducted for the fixed unit price of ..... $_____ per foot
(DEDUCT))

F. Furnish all equipment, labor, and materials and performing all operations necessary to drill, construct, and install a stainless steel monitoring well with 30 foot screen to a depth of 180 feet including steam cleaning of equipment and materials installation of filter pack and grouting for the lump sum of ..... $_____ each

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F.1 In the event the monitoring well installation is greater than 180 feet, additional monitoring well length will be installed for the fixed unit price of .....

$_____ per foot
(ADD)

F.2 In the event the monitoring well installation is less than 180 feet, omitted monitoring well length will be deducted for the fixed unit price of .....

$_____ per foot
(DEDUCT)

G. Furnish all equipmnt, labor, and materials and performing all operations necessary to develop the monitoring well until a sediment-free as possible discharge is achieved for the fixed unit price of .....

$_____ per hour

H. Furnish all equipment, labor, and performing all operations necessary to remove 4,800 gallons from the well by pumping for the lump sum of ..... $_____ per well

I. Approved Drilling Contractor standby time resulting from General Contractor related activities such as geophysical logging, support services, waste storage, etc., will be assessed at the fixed unit price of .... $_____ per hour

J. Additional equipment steam cleaning as directed by the Koppers Representative will be assessed at the fixed unit price of ... $ __ per hour

K. Additional mud changes as directed by the Koppers Representative will be assessed at the fixed unit price of ..... $_____ each

by _____ TITLE

(Bidder) _____

Date _____

All prices and cost data shall remain firm for a period of 90 days after receipt of bid quotations.

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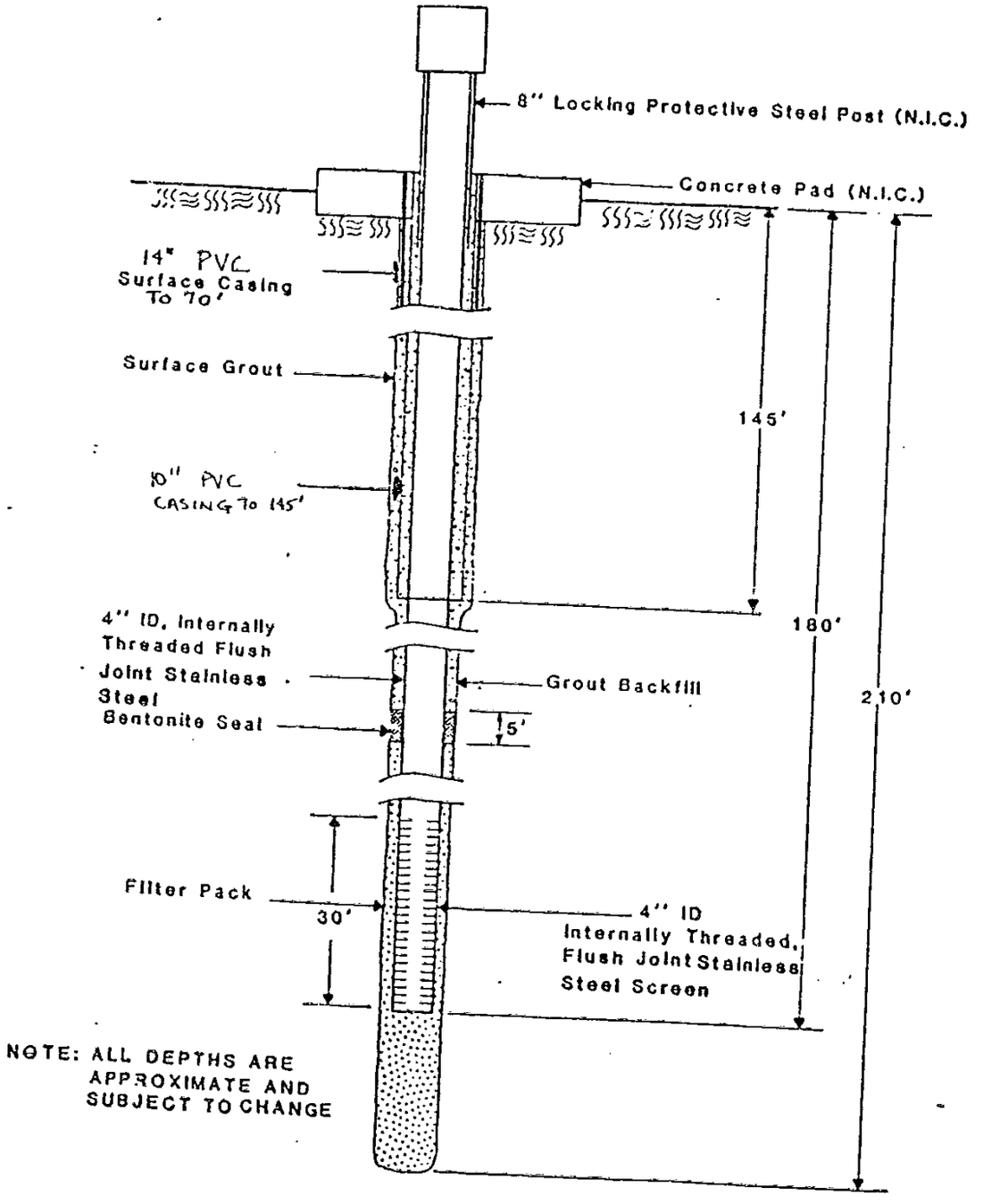

Deep Groundwater Monitoring Well
(NOT TO SCALE)

KOPPERS SOUTH CAVALCADE SITE
HOUSTON, TEXAS

FILE NO. 85-317
FIGURE NO. 1

McBride-Ratcliff and Associates, Inc.

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